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The granger causality relationship between human development and economic growth: The case of Norway

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ABSTRACT

The Human Development Index (HDI), which measures a country's human development level, considering health, education and income indicators of countries has been published in the Human Development Report each year since 1990 by the United Nations Development Programme. Norway, which is a highly developed country, was at the top of the Human Development Index. Therefore, the aim of this study is to evaluate Norway's human development performance. In this context, the relationship between human development and economic growth has been examined empirically for Norway for the period 1990-2017. In the study, firstly, ADF and PP unit root tests were applied. Then, Granger causality analysis was performed. The findings from the study show that there is a one-way causality relationship from human development to economic growth.

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Introduction

Historically, economic growth and development has taken place among the goals of states. The concept of development was accepted only as “economic growth” before 1970s and was generally seen as equal with increasing revenues (Anand & Ravallion, 1993: 133). But a high per capita GDP or GDP growth alone of a country does not mean that the country is a developed country. The most important factor is that people can lead a better life rather than the wealth of countries. Therefore, while the concept of growth is limited to only economic indicators, development which is the main goal that many countries want to achieve today, is a multidimensional concept that includes a country's economic, social, political, cultural and structural changes (Bolat & Çılan, 2007: 223-224; Öztürk, 2016: 3403).

The Human Development Reports which is published by the United Nations Development Programme (UNDP) every year since 1990, show both the development status of the countries and assist in how to eliminate the failures and deficiencies in the path to the development target (Uçan & Koçak, 2018: 56). The human development approach which was first launched in 1990 and sets out the improvement of people's lives as the main purpose of development has become a more comprehensive pioneering measure that reflects health and education by going beyond income alone (Stewart, 2019: 135; Pourmohammadi et al., 2014: 73-75). Human development which can be defined as enlarging people's choices to ensure a longer, healthier and more satisfying life has come to the forefront as the main goals of development and its relationship with economic growth has become a central issue. Because it is accepted that healthier and more educated people contribute more to the increase in economic growth performance.

When looking at the human development index of Norway, it is seen that it shows a high and stable performance. As known, Norway is a highly developed country and has also performed good performance in terms of human development. For this reason, the main topic of the study is examining Norway's human development performance.

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The aim of this study is to examine the relationship between economic growth and human development in Norway empirically for the period 1990-2017. For this purpose, Granger causality test was applied to test whether there is a relationship between the variables. After this introduction, the rest of the study is organized as follows: In the second part, the conceptual framework is explained. In the third section, information about the economy of Norway is given. In the fourth section, literature review has been made. After, the data set has been explained. Then, econometric method, application results and their interpretation are presented. In the last section of the study, the findings of the study is summarized.

Literature Review

Theoretical and Conceptual Background

The Concepts of Economic Growth and Human Development Index

The importance of economic growth and development should not be overlooked in order to measure and evaluate a country's economic performance. Economic growth which is the main subjects of economics, can be defined as the increase of goods and services produced by an economy over time (Shome & Tondon, 2010: 335). Development is a broader concept that includes economic growth and emphasizes change, transformation, quality of life and social recovery in its social, cultural and political structures (Taban & Kar, 2014: 1-4). In other words, development is not only limited to economic dimensions, but it also includes all changes in the social structure. Human development is a human oriented development approach. "Human development" which is based on the expansion of all economic, cultural, social or political choices and options, puts people at the center of development (Gürses, 2009: 340).

Economic growth and income make sense for human development but are not sufficient alone. Because economic growth does not create happiness, prosperity and better health on its own (UNDP & Landin, 2005: 13). Human development which focuses on improving people's living standards is about expanding the wealth of human life rather than just the wealth of the economy in which people live (Becherair & Tahtane, 2017: 67). The concept of human development which does not consider an income-oriented development approach sufficient, puts people at the center of development and emphasizes the need to use social data along with economic data. Human development is the process of enlarging people's choices (UNDP, 2016: 2) and highlights the daily experiences of people, including economic, social, legal, psychological, cultural, environmental and political processes (Khodabakhshi, 2011: 251). In other words, human development which is a human-centered approach, is entirely human; it is about expanding people's freedom and choices, improving their talents and opportunities (UNDP, 2016: 25). The main purpose of human development is to create an environment that allows people to enjoy long, healthy and creative life (Ranis & Stewart, 2009: 49; Constantini & Monni, 2005: 329).

Table 1: Comparison between Human Development and Economic Growth

Human Development (HDI)	Economic Growth (GDP)
Development is seen as a process of expanding people's choices (social, economic, political)	Development is seen as a process of increasing quantitative outputs of goods and services
People's functionings and capabilities are important measures	Utility is a necessary measure
Human capabilities, equality of outcomes, fairness and justice in institutional arrangements matter a lot in development process	Economic well-being and efficiency matter a lot in development process
Considers human outcomes, deprivational and distributional measures	Considers economic activity and condition, averages and aggregate measures
People are themselves ends (as beneficiaries) and means as well (as agents)	People are seen as a means through human capital (human resources for economic activity)
There is both individual action and collective action	There is more of individual action than collective
Emphasis is on equality and on the human rights of all individuals	The main concern has to do with reduction of poverty through production of goods and services
Human rights and freedoms have intrinsic value and are development objectives	Income and resources are essential for achieving economic growth
Conditions enabling human development include; <ul style="list-style-type: none"> • Health services • Education services • Employment opportunities • Democracy • Environmental protection 	Conditions enabling economic growth include; <ul style="list-style-type: none"> • People's knowledge and skills (human capital) • Efficient use of human capital • Sound economic policy

Source: Mwije, 2012: 3.

In table 1, a comparison is made between human development and economic growth. The table gives us an idea of the need to shift from economic growth to human development (Mwije, 2012: 3).

It is assumed that it represents a concept intertwined with the concept of human development, economic growth, in other words, there are strong mutual connections between economic growth and human development. On the one hand, economic growth provides resources to allow continuous improvements in human development, on the other hand, healthy and educated people create efficient workforce. Continuous improvements in the quality of human capital, namely improving human development, are considered to

contribute significantly economic growth (Daniela-Mihaela & Oana-Georgiana, 2015: 119-121; Ranis & Stewart, 2005: 1; Bolat & Çilan, 2007: 224).

Human development index which measures the welfare levels of people living in the country as well as the development levels of countries (Tıraş, 2019: 16-18; Daniela-Mihaela & Oana-Georgiana, 2015: 118; Öztürk, 2016: 3403), published each year since 1990 in the Human Development Report. The purpose of the reports prepared and published by a team led by Pakistani economist Mahbub ul Haq for the first time is to emphasize that people should be at the center of national and global development policies and draw the attention of the international community to the importance of people's quality of life (Gürses, 2009: 341). The index is used to highlight the human development profile of countries and to rank and categorize them according to human development index scores (Mahajan, 2013: 1). The value of the index is between 0 and 1. The values close to 0 indicate the lower human development level, while the values close to 1 indicate the high development level (Al-Hilani, 2012: 24). The human development index is designed to cover three areas of socio-economic life. These are; income, education and health (Hicks, 1997: 1285; Tıraş & Ağır, 2018: 24-25).

- **Income:** It refers to the resources needed to obtain the essential goods and services necessary to ensure a good life. It is obtained by calculating the GDP per capita by purchasing power parity.
- **Education:** It is accepted that the basic factor affecting the production and accessibility of information in a society is the education level of people. The expected schooling year in the country and the average schooling year are used to determine the education index.
- **Health:** It expresses life expectancy at birth which includes a long and healthy life.
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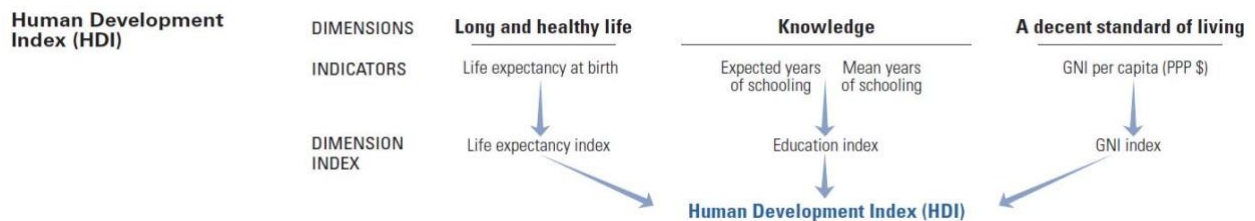


Figure 1: Human Development Index (HDI); Source: <http://hdr.undp.org> (Accessed: 05.11.2019)

Figure 1 shows the human development index components. As seen from the figure, the human development index focuses on the human center; it is a composite index that measures three dimensions: a long and healthy life, education and having a good standard of living.

Education and health dimensions are of great importance for a quality life. These can help people improve their quality of life and reach other riches. The income dimension is added because most of people's capacity to succeed depends on income (Öngel et al., 2011: 435). These dimensions are derived from the concept of human talents proposed by Amartya Sen, who won the 1998 Nobel Prize in economics and are considered the basic requirements for developing human talents (Noorbakhsh, 1998: 590). From this point of view, it is seen that human development which aims to raise the living levels of people to the living standards of the modern world, has a meaning that goes beyond economic development (Doğan & Tatlı, 2014: 102). Because human development, living a long and healthy life, being educated, knowledgeable, accessing resources and social services and achieving a good standard of living are the main resources. If these basic choices can't be made, it will be difficult to have many options and access many opportunities in life (Bundala, 2012: 7).

General Situation of the Norwegian Economy and the Human Development Performance of Norway

Norway is one of the most economically developed countries in the world. The total population of Norway was 5.314.336 in 2018 (<https://data.worldbank.org>), the surface area is 323.802 km² (<https://www.cia.gov>). Norway's capital is Oslo and the country is a unitary state governed by a constitutional monarchy based on parliamentary, democratic and representative principles (Anderson et al., 2016: 10). The country's currency is Norwegian krone (NOK). Norway declared independence on 17 May 1814 (Buxrud & Fangen, 2017: 2-8) and today, it is one of the countries that have become extremely important especially in terms of economic, political, cultural and social developments.

A change and social transformation has taken place in Norway after World War 2 and has become a social democratic country with a large, effective and important public sector, a strong public administration and a capitalist production system (Grytten, 2014: 2). Norway is a European country. However, it is not a member of the European Union. Norwegian people refused to join the European Union in the referendums held in 1972 and 1994 (<https://www.norgeshistorie.no>). But Norway, which has been a member of the European Economic Area since 1994 is located in the common market in the EU (Anderson et al., 2016: 10).

The Norwegian economy is an example of a mixed economy that includes a combination of both free market activities and government intervention (Çiçek & Çiçek, 2012: 203). Norway has a vibrant private sector, a large state sector and a stable economy

with a broad social safety net. The education level, welfare level, labor force participation rate are quite high, low poverty level and more equal income distribution. At the same time, according to the World Happiness Report, Norway is among the happiest countries in the world. The report is produced by the United Nations Sustainable Development Solutions Network, considering the criteria such as GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity and corruption perception (United Nations, 2019). Norway, which has a developed welfare system is one of the countries with the highest living standards in the world. This can be said due to Norway's low unemployment level, a productive and adaptable economy and a high labor force participation rate (Finansdepartementet, 2009: 6).

With the discovery of oil and natural gas reserves in the 1970s, the Norwegian economy began to recover rapidly and today, Norway stands out as one of the most developed countries in the world. Today, natural gas and oil represent a large part of Norwegian GDP and is one of the country's largest industries in terms of value creation, government income, investment and export (<https://www.dr.dk>; Malkovsky, 2015: 1). Norway, a country rich in natural resources such as oil and gas, fish, forests and minerals, is a leading producer and the second largest seafood exporter in the world after China (<https://www.cia.gov>). Other important sectors include hydroelectricity, fish, forests and minerals (<https://www.heritage.org>). Norway, which is one of the most egalitarian societies in the world (Wahl, 2015: 153) and one of the countries with the best living conditions in the world has also high social spending. Especially, public spending in education and health is important and accordingly there is a highly developed social security and health system.

According to the Legatum Prosperity Index, Norway ranks first among 149 countries in 2018. The index consists of 9 components: economic quality, business environment, management, education, health, safety and public order, personal freedom, social capital and natural environment.

Table 2: Norway's Legatum Prosperity Index in 2018

Component	Rank
Economic Quality	7
Business Environment	11
Management	3
Education	4
Health	8
Safety and Public Order	1
Personal Freedom	9
Social Capital	3
Natural Environment	8

Source: <https://www.prosperity.com> (Accessed: 06.11.2019)

In general, when we evaluate table 2, Norway ranks high in the components in question. We can see from the table that Norway takes place in the first step in the safety and public order component.

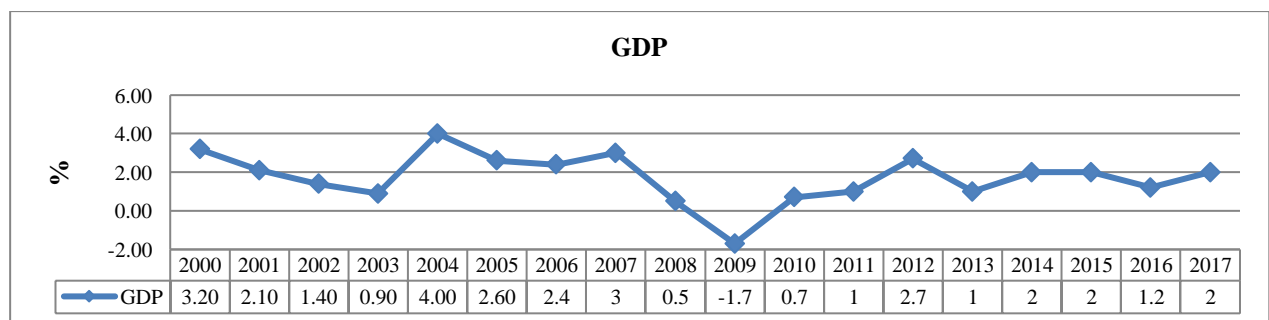


Figure 2: Norway's GDP rate 2000-2017, (%); **Source:** <https://databank.worldbank.org> (Accessed: 24.10.2019)

In figure 2, economic growth rate (GDP) data of Norway between 2000-2017 are given. As seen from the graph, after Norway's solid GDP growth in the period between 2004-2007, the economy started to slow down in 2008 and decreased to negative in 2009. Norway, which was not affected by the 2008-2009 financial crisis in general, can be said that Norway recovered from the economic contraction without much injury (OECD, 2012: 11). Besides, unemployment rate is at the bottom of other countries, respectively, 2.5% and 3.1%. Compared to other OECD countries, the Norwegian economy is one of the countries with a lower unemployment rate. Norway has started to grow modestly and positively between 2010-2017. Although Norway's economic growth has slowed, its GDP per capita remains impressive. Because while the national income per capita was 75.704 \$ in 2017, in 2018, it increased by 8.06% and become 81.807 \$ (<https://www.macrotrends.net>).

Table 4: Some Important Indicators for the Norwegian Economy

	2010	2011	2012	2013	2014	2015	2016	2017
Population	4.623.291	4.953.088	5.018.573	5.079.623	5.137.232	5.188.607	5.234.519	5.276.968
Unemployment (%)	3,52	3,21	3,12	3,42	3,48	4,29	4,67	4,16
Inflation (%)	2,41	1,28	0,69	2,12	2,04	2,17	3,55	1,87
Education Expenditure (% of GDP)	6,7	6,4	7,4	7,5	7,7	7,6	8,0	-
Export (million US \$)	112584	111667	113588	111572	115372	120381	121664	123732
Import (million US \$)	80672	83854	86250	90540	92352	94139	96655	98471
GINI Index	25,7	25,3	25,7	26,4	26,8	27,5	-	-

Source: <https://databank.worldbank.org>; <https://data.oecd.org> (Accessed: 30.10.2019)

Some important indicators for the Norwegian economy are given in table 4. As seen from the macroeconomic indicators, according to 2017 data, the population of Norway is 5.276.968. We can see from the table that unemployment increased from 3.52% in 2010 to 4.16% in 2017. When we look at it since the 1970s, it has been observed that unemployment in Norway has never been an important problem. Considering the data from the World Bank page for the years between 1972-2017, the lowest employment rate in Norway was 1.46% in 1977 and the highest unemployment rate was 6.30% in 1995. While the inflation rate was 2.41% in 2010, it decreased to 1.87% in 2017. Hence, it has been observed that the inflation rate in Norway between 2010-2017 is low. It is observed that the share of Norway's education expenditures in GDP for the period 2010-2016 follows a course of 6-8%. In this context, the importance of government expenditure on education field of Norway which has a high education system as much as possible cannot be ignored. Norway is an economy that can yield foreign trade surplus especially due to oil and natural gas resources. Although Norway's GINI coefficient increased from 25.7 in 2010 to 27.5 in 2015, it is a more equal country compared to world countries.

Table 5: Norway's Human Development Performance

Year	HDI	GDP per capita (2011 PPP \$)	Life expectancy index	Life expectancy at birth (Year)	Expected years of schooling	Mean years of schooling	Literacy rate (%)	Education index
2000	0.917	58045.07	0.905	78.8	17.5	12.0	99.00	0.888
2001	0.916	58956.39	0.908	79.0	17.1	12.1	99.00	0.878
2002	0.918	59482.37	0.911	79.2	17.1	12.1	99.00	0.880
2003	0.924	59678.45	0.915	79.5	17.5	12.2	99.00	0.892
2004	0.934	61675.6	0.919	79.7	17.6	12.7	99.00	0.913
2005	0.932	62864.8	0.923	80.0	17.5	12.4	99.00	0.901
2006	0.936	63854.11	0.927	80.2	17.6	12.5	99.00	0.907
2007	0.938	65083.26	0.930	80.5	17.6	12.6	99.00	0.907
2008	0.938	64586.15	0.934	80.7	17.4	12.7	99.00	0.905
2009	0.938	62698.29	0.937	80.9	17.4	12.7	99.00	0.905
2010	0.942	62350.41	0.941	81.1	17.6	12.7	99.00	0.912
2011	0.943	62145.03	0.944	81.3	17.6	12.8	99.00	0.914
2012	0.942	63003.41	0.946	81.5	17.5	12.6	99.00	0.907
2013	0.946	62896.29	0.949	81.7	17.7	12.7	99.00	0.914
2014	0.946	63419.31	0.952	81.9	17.7	12.5	99.00	0.907
2015	0.948	64028.39	0.954	82.0	17.7	12.5	99.00	0.908
2016	0.951	64220.37	0.957	82.2	17.9	12.6	99.00	0.915
2017	0.953	64965.39	0.959	82.3	17.9	12.6	99.00	0.915

Source: <http://hdr.undp.org/en/data>; <https://www.macrotrends.net>; <https://data.worldbank.org> (Accessed: 26.10.2019)

Table 5 shows the human development index data calculated by the United Nations Development Programme (UNDP) and published annually in the Human Development Report. It also shows some socio-economic indicators (GDP per capita, life expectancy index, life expectancy at birth, expected years of schooling, mean years of schooling) used in the calculation of the index are given. In addition to these, literacy rate and education index are also given.

As mentioned earlier, when examining the human development index, indicators such as income, health and education are taken into consideration (UNDP, 2002: 34). According to the development levels of the countries, the human development index is categorized into four groups. These are: very high human development (between 0.800-1.000), high human development (0.700-0.799), medium human development (0.550-0.699) and low human development (0.550-0.000) (UNDP, 2018: 3).

In table 5, human development index and its main factors for Norway in the period between 2000-2017 are given. With a very high human development index, Norway's human development index showed a course fluctuating between 2000-2004, and since 2005, it has been a country whose human development level has been constantly increasing. The reason for changes in human development index and country rankings is while the value of the human development index was calculated for 174 countries in 2000, in 2017, 189 countries were taken and it can also be because of the performance of the countries (Şeker, 2011: 12). In addition to these, it can be said that it received changes and updates to the calculation technique and data set (Akçiçek, 2015: 7).

Norway is in the highest rank in terms of human development index and hence is in the group of very high human development index (UNDP, 2018). Norway's human development index value is increased from 0.850 to 0.953 in 1990-2017, an increasing by 12.1%. In brief, it has shown a successful and good performance in terms of Norway's human development level. It is seen that Norway also displays a successful performance in terms of life expectancy index, education index, literacy rate and schooling rate. Besides, in the period between 2000-2017 life expectancy, life expectancy at birth, expected years of schooling, mean years of schooling, education index and GDP per capita values showed an increase. It can be said that the reason why Norway and the other Scandinavian countries perform well in terms of human development is due to their high level of trust in society, high level of cooperation, low level of inequality, low level of corruption and a developed welfare state (<https://www.norway.no>).

Empirical Studies

In this section, a summary of the empirical literature on the impact of economic growth and human development will be presented.

Ranis et al. (2000) examined the relationship between human development and economic growth using regression analysis for 35 to 76 developing countries for 1960-1992. According to the results, it has been concluded that there is a bidirectional positive relationship between economic growth and human development. Abraham and Ahmed (2011) analyzed the relationship between human development and economic growth for Nigeria over the period 1975-2008. According to the analysis findings obtained, a negative but insignificant relationship between economic growth and the human development index was determined. In addition, the coefficient was found to be significant for a long-term relationship.

Elistia and Syahzuni (2018) analyzed the impact of human development index on economic growth in 10 ASEAN member countries during the period 2010-2016. According to the results of the study, there is a strong and significant correlation between human development index and economic growth. It has been concluded that the level of human development index can influence the GDP per capita. Şaşmaz and Yayla (2018) in their study investigated the relationship between direct tax, indirect tax and economic growth and human development in European Union Transition Economies (11 countries) for the period 2004-2015 by using Emirmahmutoğlu and Köse causality test. According to the results obtained as a result of the analysis, a unilateral relationship from direct taxes to human development and from human development to economic growth has been determined, while a bidirectional causality relationship between indirect taxes and human development has been observed. Uçan and Koçak (2018) examined the relationship between human development index and growth in Turkey, Germany, USA, Norway and Italy for the period 1990-2015 by using panel data analysis. According to the pedroni cointegration test results, a long-run relationship has been determined between human development index and growth.

Aydın (2019) in his study investigated the relationship between human development and economic growth for Turkey for the period of 1990-2017 by using Hacker and Hatemi-J bootstrap causality test, ARDL cointegration, DOLS and FMOLS methods. According to the findings, a bidirectional causality relationship between human development and economic growth and that the variables act together over the long-run has been determined. Balcı and Özcan (2019) examined the relationship between human development index and economic growth for 54 OIC countries between 2005-2017. According to the findings, a significant relationship has been determined between human development and economic growth. Chikalipah and Makina (2019) studied the relationship between economic growth and human development in Zambia by applying cointegration and vector error correction model techniques on the data covering 1970-2015. According to the analysis findings, a long-run causality relationship between economic growth on human development has been determined. However, no significant impact has been detected in the short-run.

Research and Methodology

Data Set

Human development can have a decisive impact on economic growth. Therefore, the relationship between these two variables was tried to be evaluated within the scope of the Norwegian economy. Annual GDP and human development index series from 1990-2017 were used to examine the causality relationship between Norway's economic growth and human development. Data on economic growth are obtained from the World Bank (WDI) page and the human development index are obtained from the United Nations Development Programme page. In order to investigate the relationship between the variables in the study firstly, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test have been performed because they are widely used in the literature. Then, the existence of a causality relationship between the series was examined by Granger causality analysis. Details on the variables used are shown in table 6.

Table 6: Data Used in the Study

The name of the variable	Explanation	Use form	Source
GDP	Economic growth (%)	Logarithmic	World Bank
HDI	Human development index	Logarithmic	United Nations Development Programme

Econometric Method and Application Results

In order to analyze the relationship between economic growth and human development within the scope of the applied analysis, these variables should be equally stable. In this study, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests have been used to examine the stationarity of the series. For ADF and PP unit root tests, the null hypothesis means that the unit root exists, that the series is not stationary and the alternative hypothesis is the series is stationary. The hypothesis of unit root tests is as follows (Neill & Zimmermann, 2011):

H₀: The series is not stationary, it contains a unit root.

H₁: The series is stationary; the unit does not contain a root.

The functional formula of the variable examined in this study is proposed as follows:

$$GDP = f(HDI_t)$$

In the formula, GDP is the economic growth rate and HDI is the human development index.

Table 7: ADF ve PP Unit Root Tests

Variables-Method	Intercept		Trend and Intercept		Result
Economic Growth (GDP)	t-Statistic	Prob.	t-Statistic	Prob.	
ADF	-2.826673	0.0678	-3.601018	0.0487	
	-6.381738	0.0000	-6.233758	0.0001	
	-5.159333	0.0004	-5.069657	0.0025	I(2)
PP	-2.826673	0.0678	-3.620178	0.0468	
	-8.551134	0.0000	-8.310127	0.0000	I(1)
Human Development Index (HDI)	t-Statistic	Prob.	t-Statistic	Prob.	
ADF	-3.305403	0.0246	-1.539549	0.7899	
	-1.093783	0.6982	-5.966064	0.0003	
	-6.093174	0.0001	-6.101987	0.0004	I(2)
PP	-8.907266	0.0000	-1.585168	0.7722	
	-4.525981	0.0014	-7.392079	0.0000	I(1)

ADF and PP unit root tests were performed and the results are presented in table 7. According to ADF and PP unit root test results made with annual data, the variables carry unit root at their levels. As can be seen from the variables, in the ADF unit root test, all variables are stationary at I(2). In the PP unit root test, all variables are stationary at I(1). Thus, the variables do not contain unit roots.

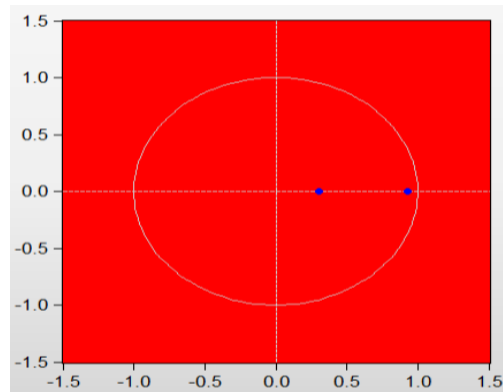


Figure 3: Inverse Roots of AR Characteristic Polynomial

As can be seen in figure 3, all of the inverse roots of the AR Characteristic Polynomial are located within the unit circle. This means that all of the variables are stationary and the predicted model has a stable structure. As can be understood from here, the model created is suitable model because the applied model provides stability conditions.

Table 8: Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	146.3116	NA	2.05e-08	-12.02597	-11.92780	-11.99992
1	192.3475	80.56290*	6.20e-10*	-15.52896*	-15.23445*	-15.45083*
2	193.9309	2.507022	7.65e-10	-15.32758	-14.83672	-15.19735
3	195.6917	2.494361	9.43e-10	-15.14097	-14.45377	-14.95866
4	201.3371	7.056789	8.58e-10	-15.27809	-14.39455	-15.04369

It is useful to determine the lag length criteria before proceeding to the Granger causality analysis. In table 8, the lag length criteria has been examined. According to Akaike Information Criterion (AIC) the lag length criteria is determined as 1.

The causality relationship can be determined by economic theory and causality analysis. As a result of the causality test, four different situations can arise between two variables such as A and B (Tari et al., 2019: 436-437):

1. A affects B
2. B affects A
3. A and B affect each other
4. There is no causality relationship between A and B

Whether economic growth and human development affect each other has been tried to determine with the help of Granger causality test. The Granger causality test which is commonly used to examine the causality relationship between two time series variables, was first proposed by Granger. Therefore, it has been tried to determine whether economic growth and human development affect each other with Granger causality test. Accordingly, the equation for causality relationship between variables is expressed as follows.

Model that human development is the cause of economic growth:

$$GDP_{i,t} = b_0 + \sum_{i=1}^m b_i GDP_{t-1} + \sum_{i=1}^m a_i HDI_{t-1} + v_{i,t}$$

Model that economic growth is the cause of human development:

$$HDI_{i,t} = a_0 + \sum_{i=1}^m a_i HDI_{t-1} + \sum_{i=1}^m b_i GDP_{t-1} + u_{i,t}$$

The results of the Granger causality test are given in table 9.

Table 9: Granger Causality Test

Dependent Variable: GDP	Prob.	Result
HDI	0.0250	There is a causality from human development to economic growth.
All	0.0250	
Dependent Variable: HDI		There is no causal relationship from economic growth to human development.
GDP	0.3606	
All	0.3606	

Granger causality test was carried out by using the Eviews program. When we determine out dependent variable as economic growth, the probability value is less than 0.05. Therefore, we reject H_0 and H alternative. However, when our dependent variable is determined as human development, the probability value is greater than 0.05, while H_0 is accepted H alternative is rejected. As a result, there is a one-way relationship between economic growth and human development. The direction of this relationship is from human development to economic growth. In other words, human development is a reason for economic growth.

Conclusions

It would not be correct to evaluate the development of a country alone with economic growth and per capita income. It would be more correct to evaluate multidimensionally, that is, beside these, socially, environmentally and culturally. Human development is a concept that does not consider an income-oriented development approach sufficient but puts people at the center of development and emphasizes the need to use social data together with economic data. The human development index, developed by United Nations Development Programme since 1990, is an approach that includes indicators such as income, health and education and thus is used to measure people's living standard.

Considering the human development index of Norway which has achieved a successful performance in terms of economic progress and prosperity, it is seen that it ranked first among 189 countries in 2017 with an index value of 0.953. Therefore, Norway is at the "very high human development" category on human development index. Norway which has an economy dominated by oil, natural gas, forestry, fisheries, hydroelectric production in terms of natural resources, has been observed to have very positive indicators in terms of GDP, GDP per capita, unemployment, inflation and foreign trade.

In this study, which aims to analyze the human development performance of Norway, firstly, the conceptual framework is explained. Afterwards, general information about Norwegian economy is given and Norway's human development performance is examined. Finally, the Granger causality test is applied to examine the relationship between human development and economic growth. The data set of human development and economic growth variables examined in the study covers the period 1990-2017. The findings from the study show that there is a one-way relationship from human development to economic growth. According to these results, it is expected that the supports to be applied for the three dimensions of human development, namely income, education and health and the policies to be developed in this context will contribute to the economic growth of the country.

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